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FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

MAY 28 1993  
FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

In the Matter of

Replacement of Part 90 by Part 88 to  
Revise the Private Land Mobile Radio  
Services and Modify the Policies  
Governing Them.

)  
)  
) PR Docket No. 92-235  
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)

COMMENTS OF AERONAUTICAL RADIO, INC.

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## SUMMARY

Aeronautical Radio, Inc. (ARINC) and the air transport industry generally support the Commission's proposals to increase the land mobile communications capacity in the bands below 800 MHz. The following Comments recommend a few

cooperative use of non-commercial communications facilities. ARINC submits that its very existence and success are evidence enough for the efficacy of this form of service; shared use should be reinstated as an option in addition to the commercial radio communications options. ARINC believes that shared use will continue to foster the economic and efficient growth of land mobile services and innovative uses of this important resource.

ARINC also submits that the Commission should, if economically practicable, adopt a plan based on a 5 kHz channel spacing in the 450-470 MHz band. The technology appears to be available, and a transition from 25 kHz to 5 kHz is just as practicable as the proposed transition to 6.25 kHz channel capacity.

ARINC supports the Commission's decision to adopt contiguous spectrum allocations and to retain the existing conditions of use on the newly split channels. This will provide incentives for licensees to convert to the more efficient technology.

Finally, the Commission should be ready to grant reasonable waivers of at least the first phase of the transition to the narrower bandwidth.

With the suggestions set forth below, ARINC and the air transport industry support the proposals as set forth in the Commission's NPRM.

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COMMENTS OF AERONAUTICAL RADIO, INC.

Aeronautical Radio, Inc. (ARINC) hereby submits its  
Comments in response to the Commission's Notice of Proposed  
Rulemaking (NPRM) released herein November 6, 1992 (57 Fed.  
Reg. 54034).

I. Introduction

ARINC is the communications company of the air transport  
industry. It was established by the airlines in 1929 at the  
urging of the Federal Radio Commission to provide the full  
range of communications services required to support the  
explosive growth of civil aviation on a cooperative not-for-  
profit basis.

The early vision of the Commission's predecessor has  
been fulfilled by the air transport industry which, on a  
shared basis through ARINC, has managed and developed the  
aeronautical spectrum effectively for more than six decades.  
It has also extended these benefits to portions of the land  
mobile spectrum used in support of airline operations.  
Today, ARINC operates VHF air-ground voice services that

provide continuous coverage throughout the conterminous United States and Hawaii. Its VHF air-ground data system, known as ACARS, extends over most of North and Central America, Hawaii, and out the Aleutian chain. ACARS has become the *de facto* world-wide standard for air-ground data communications, fostering the implementation of compatible systems in Europe and the Far East. ARINC also provides HF radio service throughout the Flight Information Regions (FIRs) committed to the United States by the International Civil Aviation Organization (ICAO) for both operational control and air traffic control communications. ARINC's GLOBALink service was the first operational aeronautical satellite service and has been certificated by the Federal Aviation Administration (FAA) for digital way-point position reports on over-ocean routes. In addition to these systems that provide communications to aircraft in flight, ARINC operates 800 MHz trunked land mobile radio systems at fifteen

airports in the United States. ARINC also provides for aircraft enroute

principles enunciated in these Comments have been reviewed  
with the AEC and the AEC is in fundamental agreement with

The ten ATU channels allocated in 1968 were not sufficient to meet the needs at that time and, with the exception of ARINC's 800 MHz shared trunked system, the available capacity has not grown since. The demand for ATU services, however, has grown substantially. ATU is used to meet needs generated by the millions of passengers, workers, and visitors who pass through the nation's airports every day, and the demand for service tracks the growth in passenger enplanements. In the two decades from 1971 to 1991, airline revenue passenger enplanements have grown from 171.4 million people to 484.4 million. The FAA projects that the scheduled passenger enplanements will reach 792.9 million people in 2003.<sup>4</sup> Today, the ten ATU channels at Chicago O'Hare serve 978 mobiles and portables, and the airlines currently have another 1,484 mobiles and portables on ARINC's 11-channel 800 MHz trunked system. At JFK International Airport and nearby LaGuardia, the airlines have 1,331 mobiles on the ten ATU frequencies, but ARINC's 6-channel trunked system can only accommodate 435 mobiles. The channel loading in New York on ARINC's trunked system is less than in Chicago due to differences in traffic patterns. ARINC can




The heavy loading on these systems has forced the airlines to use local control and splinter channels to meet the communications demand, albeit with inferior service. At O'Hare, for example, the airlines have an additional 1,311 mobiles on the twelve local control channels. All tolled, the airlines now have 3,773 mobiles and portables operating within the confines of the nation's busiest airport, without consideration of assignments on splinter channels. These systems are nearing the breaking point as the communications requirements continue to grow.

Airlines use a large number of low power ATU portables to coordinate activities at the airport. These activities include the dispatching of tugs, baggage carts, catering trucks, wheelchairs, personnel, and coordinating inventory and support services. The systems are also used to respond to emergencies, such as injuries, medical crises, and accidents that occur on the airport. The demand for land mobile communications at airports will continue to grow as passenger traffic increases and as new applications are deployed. Future requirements that are currently under investigation include data radio for baggage and cargo tracking, manifest checking, and airport vehicle position reporting. These new services will have a tremendous impact on the requirement for spectrum at the airport.

The availability of wide area mobile communications systems does not offer much relief for ATU application. Airport communications are complicated by the use of low power devices, unusual coverage geometry, metal structures, and limitations on height and location of antennas. The air transport industry's experience has been that systems designed for general off-airport use cannot provide adequate service to meet the intensive communications requirements of the airlines on airports. Accordingly, there continues to be a need for additional ATU communications.

The FCC in its Notice of Proposed Rulemaking proposes ultimately a four-for-one channel split in the UHF band, the adoption of loading standards for private land mobile channels below 800 MHz, and other changes to increase the communications efficiency and utilization of these frequencies. The Commission proposes to retain the ten channels for ATU, which when split four-for-one would make forty channels available for ATU in the future. ARINC and the air transport industry generally support the Commission's proposals but believe that efficiency would be promoted by



### III. The Commission Should Retain Not-For-Profit Shared Use as an Option Under Non-Commercial Service

The FCC's proposals will make significant improvements in spectrum utilization and flexibility of use. However, the Commission should not abandon traditional non-profit shared use arrangements in favor of commercial SMRS and private carrier options. As ARINC has demonstrated, shared use through an industry intermediary can ensure spectrum efficiency, prompt introduction of new technology, and long-term planning to accommodate growth in existing services and implementation of new services. Proposed Section 88.15 would

derived from communications sharing arrangements may include: (1) services at rates closer to costs, (2) better management of communications networks, (3) efficient use of available spectrum, and (4) additional incentive for research and development."<sup>5</sup>

In order to promote an orderly transition and to employ new, more spectrally efficient systems, it may be desirable for ARINC, with the agreement of the current ATU licensees, to obtain a license for ATU systems in an exclusive use overlay and administer these channels for the eligible users. In this fashion, ARINC would administer ATU in the same way that it operates the aeronautical enroute service. Diversity in system solutions would be encouraged, but the opportunities for more common-user systems could be better exploited.

ARINC and the air transport industry do not object to the greater reliance on commercial service providers that is provided in the NPRM. However, the option for single-licensee non-profit cooperative use should be retained in the Non-Commercial Radio Service.

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<sup>5</sup> Aeronautical Enroute Service, 87 F.C.C.2d 382, 386 (1981).

IV. The Air Transport Industry Supports  
Reduced Channel Spacing

ARINC and the air transport industry support FCC efforts to improve spectrum efficiency by reducing channel spacing to only that necessary to convey the desired information, plus appropriate system frequency tolerances, with due consideration of adjacent channel selectivity. It should be kept in mind, however, that reducing channel spacing to the order of 5 kHz will improve spectral efficiency only for information that approximates that bandwidth, such as two-way analog voice communications. Reduced channel spacing does not necessarily translate into improved spectral efficiency for other modes. For example, a single wide-band multiplexed data emission may be more spectrally efficient than several narrower channels, each with its own guard band, carrying individual messages. Therefore, wider authorized bandwidths should be made available for data communications, where it is shown that the wider bandwidth is necessary and will be more spectrally efficient.

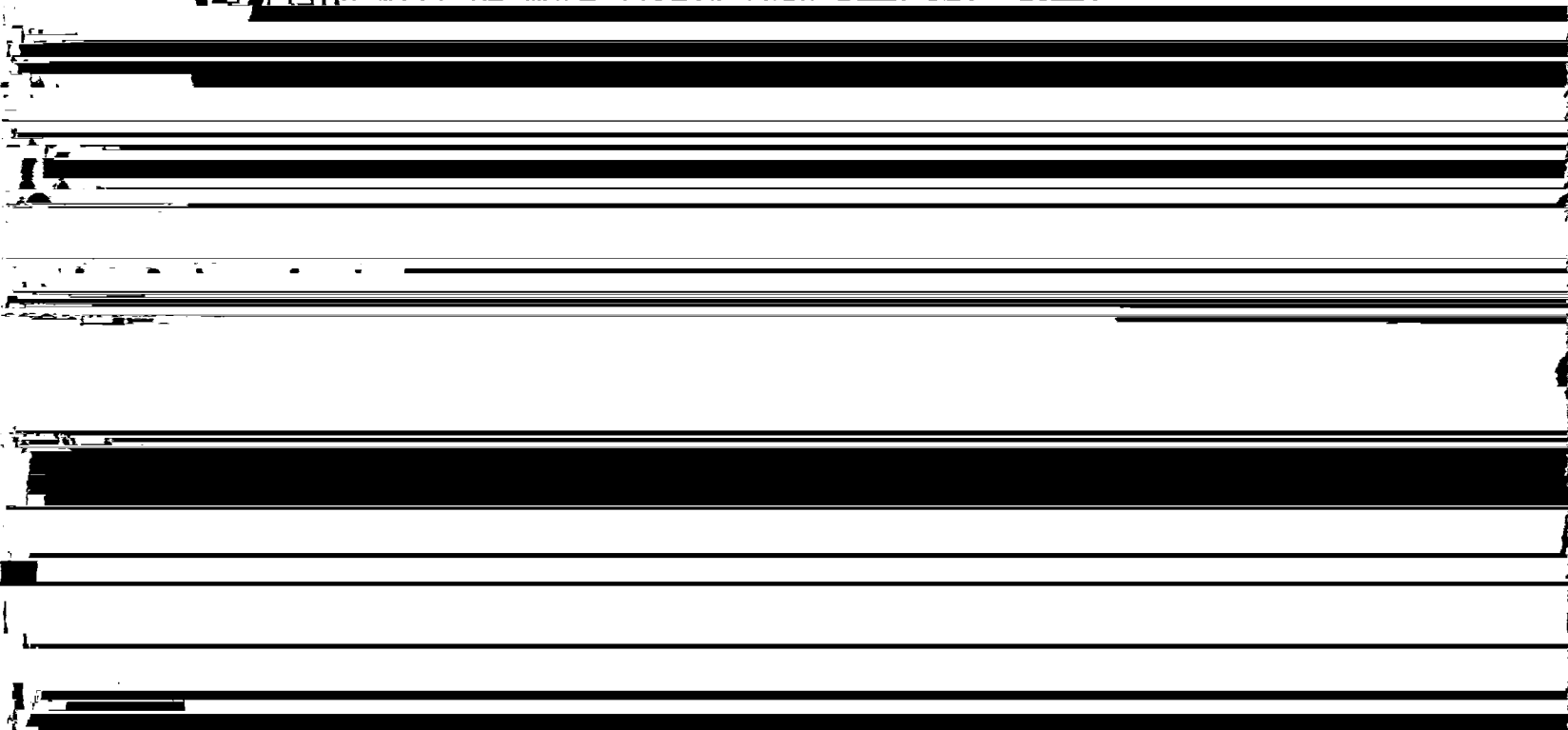
Notwithstanding this need for wider bandwidths for data, the greatest need for land mobile communications today, and for the foreseeable future, is for voice communications. Therefore, the basic channel assignment scheme should be based on the spectrum requirement for a single voice channel. Provisions should be included in the FCC Rules for

consolidation of basic channels into wider bandwidth assignments.

The choice of the basic channel assignment spacing should be based on the minimum required bandwidth necessary to support the communications function. Many studies and practical experience have shown that mobile communications are adequate for most purposes when the range of voice frequencies is from about 300 to 3000 Hz. Therefore an

definition, less spectrally efficient and deserves to be excluded. If the purpose of the technology is to support a different function, then it can be accommodated on a stacked contiguous channel assignment. If equipment is available that will permit operation on 5 kHz channels in the 150 MHz and 220 MHz bands, it should also be feasible in the 450-470 MHz band. The same IF filters and frequency display logic can be used in all bands, which should reduce the engineering and production costs. Dual-band radios will be much simpler with equal channel spacing and IF bandwidth.

The present splinter (12.5 kHz offset) channel center frequencies are not accommodated by either a 6.25 kHz or 5 kHz channel spacing, and thus do not support one channel spacing over the other. Finally, numeric displays would be more complex using 6.25 kHz spacing, and errors in channel selection will be more likely than at 5 kHz, as is evident



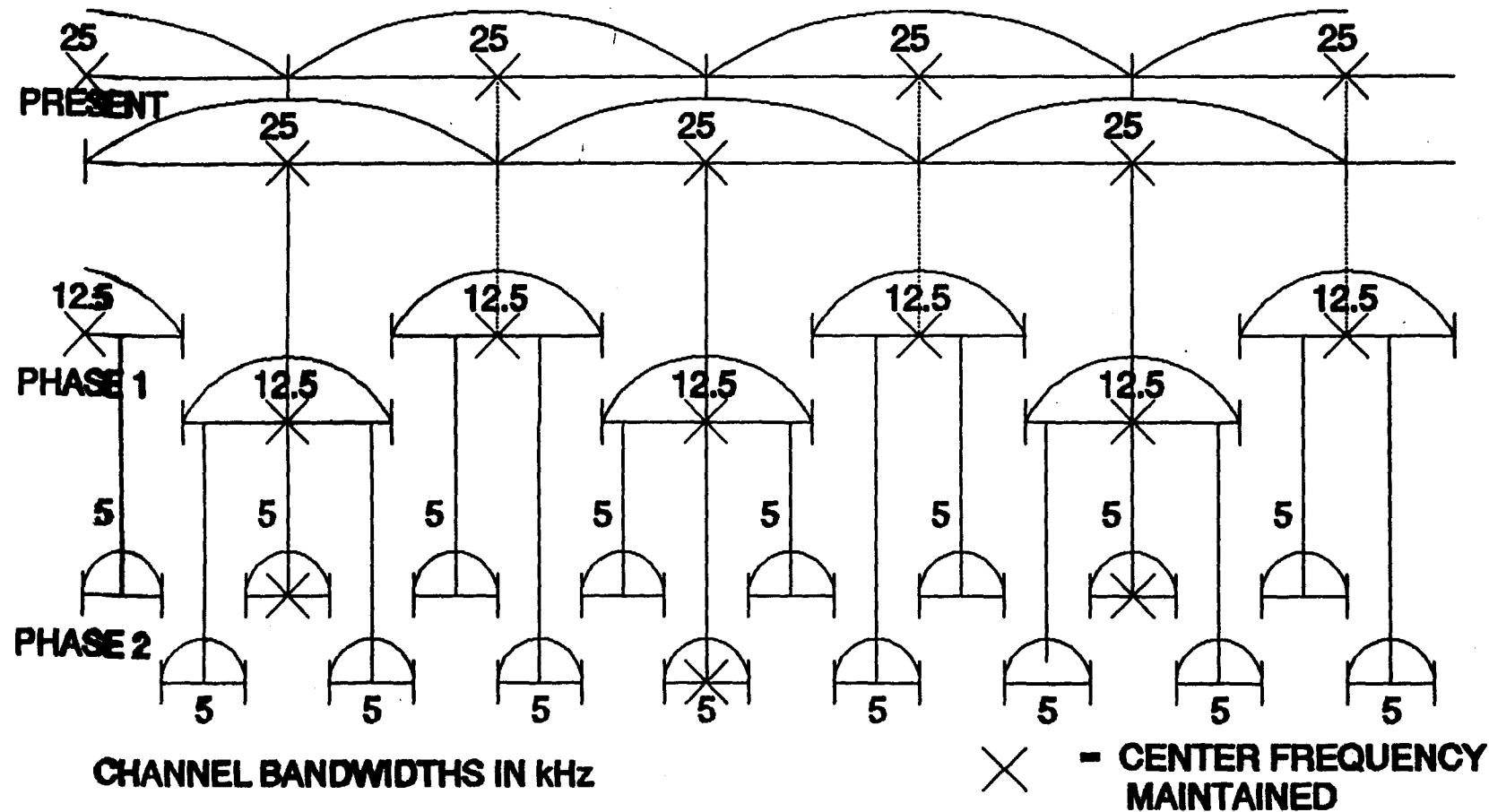
narrowest practical bandwidth that can reasonably be expected to support the most common mode of communications, and that is now 5 kHz. The 220 MHz band is already based on 5 kHz channel spacing, and the FCC's transition plan for VHF is also based on 5 kHz.

Figure 1 shows a transition plan for migration to 5 kHz spacing in the UHF band. This plan would give splinter channel licensees equal standing with primary channel licensees at Phase 1, and would permit interim voluntary conversion of split channels to two 5 kHz ones. However, only one of the primary derived 5 kHz channels can be used unless there is appropriate geographical spacing, or upon conversion of an adjacent split channel to 5 kHz.

The alternate plan shown in Figure 2 has the advantage of permitting immediate access to a three-to-one increase on current primary channels, and a two-to-one increase on current splinter channels. However, the Phase 1 deviation limit for primaries and splinters would not be equal. Therefore, if a licensee had need for operation on both primary and splinter channels, recovered audio may vary when switching channels. This problem would affect only a small number of licensees, and is also ameliorated in radios having AVC circuitry. Also, the licensees would have the option of reducing deviation on their primary channels to match that of the splinter channels. In addition, many systems are

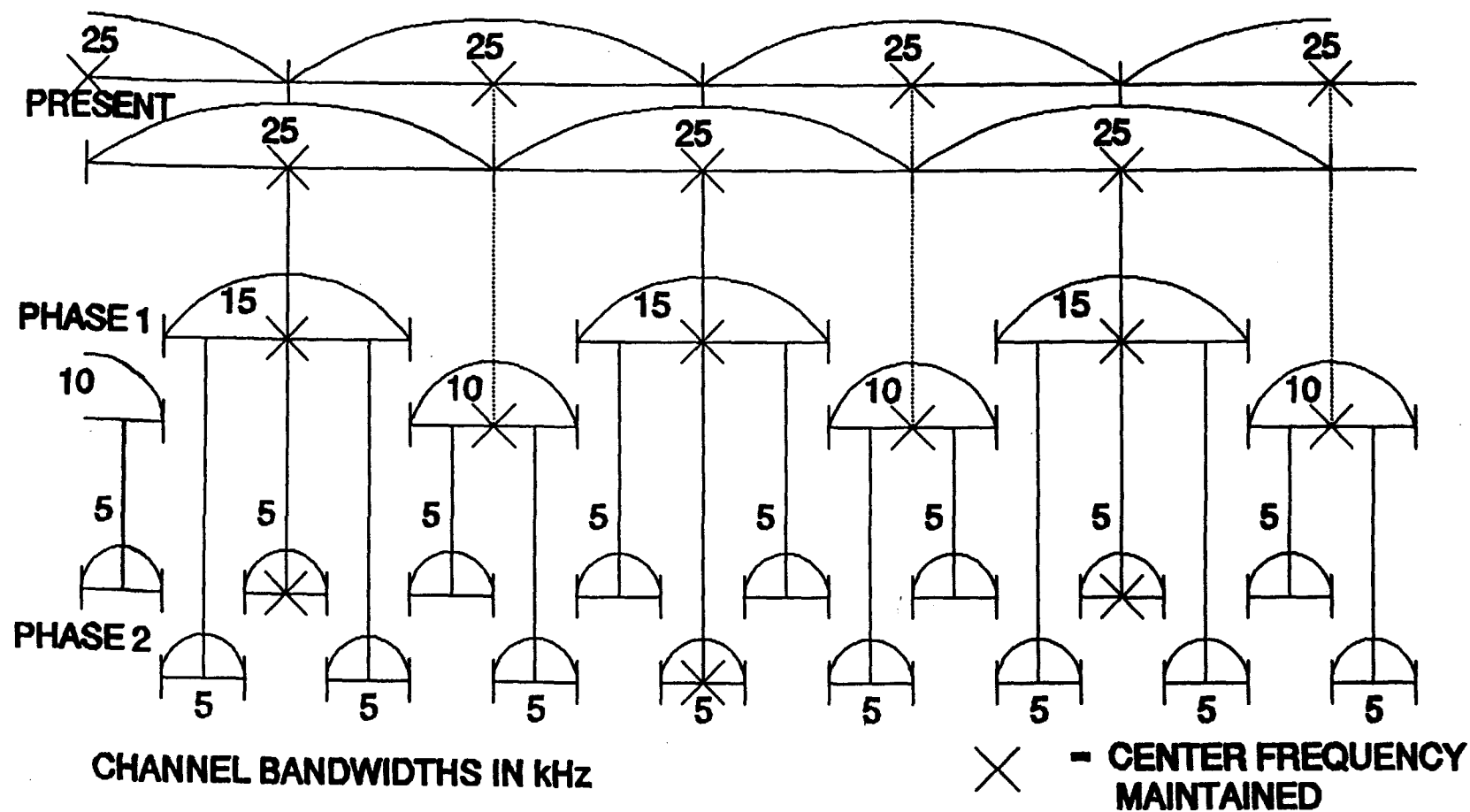


# UHF TRANSITION PLAN



**FIGURE 1**

# ALTERNATE UHF TRANSITION PLAN



**FIGURE 2**

currently operating with peak deviations considerably less than the permissible  $\pm 5$  kHz and, through use of proper microphone technique, could readily maintain current audio levels.

ARINC agrees that the initial step in transition to the ultimate channel spacing should be to eliminate the overlap of channel assignments. However, those who wish to proceed directly to the basic channel spacing should be permitted to do so.

V. Voice and Non-voice Communications Should Be Provided In Separate Channels

ARINC believes that data communications should be allowed only on an exclusive assignment basis, or conducted in a separate band segment. Additionally, appropriate separation criteria should be developed to protect analog voice channels from adjacent channel data assignments. "Short-spacing" of voice and data assignments should not be permitted. While analog voice systems using compatible modulation types can readily time-share channels, there is no practicable way to time-share between data and analog voice. Data emissions are very annoying when interspersed with voice communications, particularly when one is attempting to receive a marginal voice signal.

VI. The FCC Should Adopt Contiguous Spectrum Allocations

All channels created by reduction of channel spacing should remain allocated to the service from which they were created. Adjacent channel interference is not now considered by the FCC or frequency coordinators when assigning radio channels. However, adjacent channel interference is likely to be of major concern in a reduced channel space environment. If adjacent channels are available to services that are not within the scope of a single frequency coordinator, the adjacent channel problem will be very difficult to address.

Also, ARINC supports the incentive of granting priority for access to one of the newly created channels when converting to more efficient technology in advance of the deadline. However, we feel that this incentive should extend to all channels created from an assigned "wide-band" channel, provided that an appropriate showing of need is made.

Contiguous spectrum allocations will also aid in coordinating multiple channels for spectrally efficient wide-band data systems.

VII. Consolidation of Service Categories Is Unnecessary

ARINC objects to the proposal to reduce the number of Services to three. In fact, the FCC recently found it necessary to create a new Emergency Medical Service (EMS),

due to the incompatibility of EMS with other SERS uses. Low power, limited area coverage systems also require protection from other, possibly higher, power systems. This is particularly true for the ATU frequencies, which are currently a subset of the Business Radio Service. ARINC feels that it is essential to continue to reserve the spectrum for these low power, limited range systems, either as a protected subset of the Business Radio Service or as a separate service.

Channels created by reduction of channel spacing should not be used to support a multitude of services. Interoperability of services in neighboring jurisdictions, such as Fire, Police, and EMS cannot be maintained if the respective services of the communities do not have contiguous frequency assignments. A similar argument may be made for ATU channels, where airlines must have the ability to move communications resources in response to changes of route structure. If specific blocks of frequencies are not available on a nation-wide basis, airlines may be forced to acquire new radios whenever they initiate service at a different airport. Interspersing other services on channels created by reduction of channel spacing will cause different areas to have different available channels for a given service, thus preventing commonality of equipment and increasing the cost of the service.

VIII. The Commission Should Adopt More Flexible Channel Loading Standards

Determination of the number of channels needed to provide a service should not be based solely upon the number of mobiles to be served. The communications requirements for the various services, or even functions within services, are quite varied. For example, airline activity is concentrated around "push-back" times, which must closely conform to specific allocated flight time slots. This results in high peak channel activity. It is the peak activity which drives the channel requirement, and not the mobile unit count, or average activity. ARINC recommends that typical daily peak 15 minute period channel occupancy, on the order of 35%, be accepted as an alternative justification for exclusive channel assignment whenever the licensee demonstrates that the mobile unit count is not appropriate.

IX. The Commission Should Be Prepared to Extend the Transition Period for Good Cause Shown

The conversion date for the first phase reduction of channel spacing should be extended on a case-by-case waiver basis for those licensees who show that their particular equipment cannot be adjusted for the reduced spacing, or that their resultant service area would not adequately support their operational requirements. Such waivers should be conditioned by a requirement to replace current equipment

with equipment conforming to the very narrow band channeling requirement, or to the equivalent bandwidth of a stacked channel assignment. In only rare cases should the waiver extend beyond the second phase implementation deadline.

X. Conclusion

ARINC and the air transport industry support the Commission's efforts to increase the number of land mobile channels available and the flexibility for their use. With the suggestions set forth above, which will further increase system capacity and service flexibility, the proposed rules should be adopted.

Respectfully submitted,  
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